

## Suitability of pulse intercrops during autumn planted sugarcane through trench method

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### ABSTRACT

A field experiment was conducted during 2011-13 and 2012-14 in autumn at research farm of U.P. Council of Sugarcane Research, Shahjahanpur, (U.P.) to work out the response of inter-crops and its residual effect along with different nitrogen doses on trench planted sugarcane. The experimental soil was sandy loam in texture, low in organic carbon (0.36%), available nitrogen (260kg/ha), medium in available phosphorus (11.43 kg/ha) and potassium (124 kg/ha) with the pH value 7.7. Soil test based fertilizer recommendation per hectare was 200 kg N + 80 kg P<sub>2</sub>O<sub>5</sub> + 60 kg K<sub>2</sub>O. CoSe 01434 a mid - late maturing variety of sugarcane was tested with inter - crops like Azad pea - 1 and berseem Mescavi - 530 varieties. Among different inter - cropping systems and nitrogen doses (100% and 125% RD - N), cane + berseem along with 125% nitrogen dose through inorganics was found to be much beneficial and gave significantly higher cane yield (114.6 t/ha) than the cane planted alone in trench (107.6 t/ha). This treatment improved the cane yield by 6.06% and reflected a higher B:C ratio of 2.22 against cane alone (1.90). The inter - crop viz., Pea followed after berseem. Effect of these pulses inter - cropping on juice quality parameters was not significant.

**Key words:** Cane yield, inter cropping, sugarcane, trench planting.

Since, agriculture is the back bone of Indian economy which is facing serious threats in possibility of declining partial and total factor productivity (TFR). In the country and also at sub tropical India there is a great need to increase agriculture production and productivity through more intensive cropping system. For-tunately, sugarcane crop provides considerable scope for intercropping of short duration crops among pulses like pea, moong, urd and berseem etc. and thus improve overall productivity and profitability of the farmers as well as maintain soil health on a sustainable basis. During the formative phase of sugarcane, the mean light interception is less than 30 percent (Ramanujam and Venkataramana, 1999) and up to 70 percent of the land between cane rows is left unutilized. The sugarcane rhizosphere occupies less than one third of the soil during this period. In the

interspaces, weeds grow and affect the sugarcane tillering and growth (Sundara, 1987 & 1998). During this period, we can profitably exploit the three valuable natural resources (radiant energy, soil and space) by growing short duration intercrops.

However, sugarcane row arrangement can be changed to paired row of varying combinations such as 60 : 120 cm, 45 : 135 cm, 30 : 150 cm, etc. to accommodate more number of intercrops rows (Venkataramana, 1977; Jayabal, 1988 and Hunsal and Khot,1994). Paired row planting would help grow more intercrop and manage it better without affecting the main crop of sugarcane. Wide rows (150 cm) permit growing of profitable intercrop have been shown by the recent studies at S.B.I. Coimbatore (Sundara, 2002; Nagendran and Palanisamy, 1997). At present nutrients recommended under inter -

cropping system is as per the individual crop requirement (Palaniappan and Sivraman, 1996). Keeping these in mind this experiment have been conducted.

#### MATERIALS AND METHODS

A field experiment was carried out to study the response of inter - crops and its residual effects along with different nitrogen doses on trench planted sugarcane at U.P Council of Sugarcane Research Farm during 2011-13 and 2012-14 during autumn season. The soil of experimental plot was sandy loam in texture, low in organic carbon (0.36%) and available nitrogen (260 kg/ha), medium in available phosphorus (11.43 kg/ha) and potassium (124 kg/ha) with the pH value 7.7. CoSe 01434 a mid - late maturing variety of sugarcane was tested with intercrops like Azad Pea-1 and berseem (Mescavi -530). The experiment was laid out in a randomized block design with three replications. Observations on growth yield and juice quality parameters were taken. The cane yield and intercrops yield were recorded with calculating their B:C ratio also. The treatments consisted of six *i.e.*

T<sub>1</sub> - Sugarcane sole crop with 100% N.

T<sub>2</sub> - Sugarcane sole crop with 125% N.

T<sub>3</sub> - Sugarcane with 100% N + vegetable Pea.

T<sub>4</sub> - Sugarcane with 125% N + vegetable Pea.

T<sub>5</sub> - Sugarcane with 100% N + vegetable Berseem.

T<sub>6</sub> - Sugarcane with 125% N + vegetable Berseem.

The size of each plot was 7.2 m × 8 m and setts in rows were planted as bud to bud at 120 cm apart (10 buds per square metre) and plant to plant spacing was maintained at 10 cm.

#### RESULTS AND DISCUSSIONS

The data on growth, yield parameters of sugarcane are presented in table-1 in which highest tillers (183 thousand/ha) and millable canes (134 thousand/ha) have been observed with 125% N + berseem as compared to sugarcane sole with 100% and 125% N which was significantly better over these treatments. Sugarcane with 125% N + berseem produced significantly greater height (296 cm) and diameter of cane as well as cane yield (114.5 t/ha). These

Table 1. Effect of trench planted sugarcane based pulse intercropping during autumn on growth, yield, quality and economics.

Treatment	Germination (%)	Tillers (000/ha)	Cane height (cm)	Cane diameter (cm)	NMC (000/ha)	Cane yield (t/ha)	Inter crop yield (q/ha)	C.C.S (%)	B:C ratio
T <sub>1</sub> - Cane (trench planted) sole with 100% N	66.2	175.5	254	2.80	127.2	107.6	-	10.0	1.90
T <sub>2</sub> - Cane (trench planted) sole with 125% N	65.4	177.6	259	2.82	130.7	110.2	-	10.2	1.93
T <sub>3</sub> - Cane (trench planted) with 100% N + vegetable Pea	66.6	172.0	275	2.87	124.8	106.4	48.0	10.2	2.06
T <sub>4</sub> - Cane (trench planted) with 125% N + vegetable Pea	65.1	175.0	278	2.90	128.8	110.0	51.7	10.6	2.09
T <sub>5</sub> - Cane (trench planted) with 100% N + berseem	66.9	180.5	285	2.94	131.7	110.4	391.7	10.9	2.20
T <sub>6</sub> - Cane (trench planted) with 125% N + berseem	65.3	182.6	296	2.98	134.2	114.5	451.2	10.8	2.22
CD at 5%	NS	1.94	22.3	0.08	0.84	1.06	-	NS	-

results are in confirmation with Ojha *et al.* (1974) and Sinha *et al.*, (1988). The increase in cane yield with 125% N + berseem as attributed to improvement in growth and yield attributing parameters like cane height, cane diameter, number of millable canes and more availability of N by addition of 25% extra N and fixation of N by berseem crop. Similar findings were reported by Saini *et al.* (2005) and Singh *et al.* (2006).

Intercrops *viz.*, vegetable pea and berseem both gave more green pod (51.74 q/ha) and herb yield (451.24 q/ha) respectively, with 125% N as compared to 100% N *i.e.* 48.03 q/ha green pod of pea and 391.72 q/ha fodder yield of berseem. Germination and C.C.S percent in cane was not affected significantly with the various intercropping systems. The juice quality was unaffected with increasing fertility levels (Lakshmikanthom, 1973 and Gill and Singh, 1976).

### Economics

Sugarcane trench planted with 125% N + berseem gave maximum net returns of rupees 284479/ ha and B:C ratio (2.22) as compared to cane planted in trench as sole crop + 100% N (1.90 B:C ratio) and 125% N (1.93 B:C ratio) with net returns of rupees 196718/ha and Rs 200953/ha respectively. However, cane with 125% N + berseem gave net returns more or less similar to the cane with 100% N + berseem (Rs 279902/ ha).

### CONCLUSION

Sugarcane planted in trench with 125% N + berseem performed better as compared to sugarcane planted in trench and grown as sole crop with 100% and 125% N in terms of growth and yield parameters followed by sugarcane in trench with 125% N + vegetable pea.

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